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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/987,413	11/14/2001	Yoshifumi Iida	111115	7047

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EXAMINER

RODEE, CHRISTOPHER D

ART UNIT	PAPER NUMBER
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1756

DATE MAILED: 07/16/2003

11

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/987,413

Applicant(s)

IIDA ET AL.

Examiner

Christopher D RoDee

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 June 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7, 9-15, 18 and 19 is/are pending in the application.
- 4a) Of the above claim(s) 18 and 19 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 and 9-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

The previous grounds of rejection under § 103(a) are overcome based upon applicant's statement under § 103(c).

The discovery of new art necessitates the following grounds of rejection

Claims 1, 2, 6, 7, 9-11, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakashita *et al.* in US Patent 4,985,327 in view of Watanabe *et al.* in US Patent 4,956,258 and further in view of Fujii *et al.* in US Patent 4,855,204.

Sakashita discloses a two component developer having non-magnetic toner particles and carrier particles. The toner has a specific particle size distribution that permits the toner to faithfully reproduce thin lines in a latent image formed on a photosensitive member and excellently reproduce dot latent images, such as halftone dot and digital images. The toner provides images excellent in gradation and resolution characteristics. Further, the toner retains a high image quality even in the case of successive copying and can effect good development by using a smaller consumption (col. 4, l. 22-38). The toner has a size distribution of 17-60% by number of non-magnetic toner particles of 5 μm or smaller, 1-30% by number of non-magnetic toner particles of 8-12.7 μm , and 2.0% by volume or less of nonmagnetic toner particles of 16 μm or larger. The non-magnetic toner has a volume-average particle size of 4-10 μm , and the non-magnetic toner particles of 5 μm or smaller have a particle size distribution satisfying the following formula: $N/V = -0.04N + k$, wherein N denotes % by number of non-magnetic toner

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particles of 5 μm or smaller, V denotes % by volume of non-magnetic toner particles of 5 μm or smaller k denotes a positive number of 4.5-6.5, and N denotes a positive number of 17-60

(Abstract).

In Example 6 (cols. 25 & 26) a toner is produced from a mixture of binder resin, charge control agent, wax, and a colorant. These components are processed to give a toner having a number-average particle diameter of 7.6 μm . As seen in Table 5, the 50 % volume accumulation of particles is between 6.35 and 8.00 μm , which indicates that the volume-average particle size of the toner is in this range. Table 5 also shows that 17.2 % of toner particles by number have a size of 4.00 μm or below. This toner is mixed with hydrophobic silica having a BET specific surface area of 200 m^2/g . The reference states that a titanium dioxide having a BET specific surface area of 50 to 400 m^2/g can be used in place of the silica.

Although this example produces a one component developer the characteristics of the example's toner are within the scope of those disclosed by the reference as effective for either a one-component or two-component developer (col. 5, l. 4-21; col. 15, l. 45-48; & Summary of the Invention). Example 1 shows a two-component developer failing within the scope of the reference's invention having a ferrite carrier particle. The reference states ferrite powders may be treated with a resin (col. 15, l. 18-23). Example 13 shows the ferrite carrier treated with a vinylidene fluoride-tetrafluoroethylene copolymer.

The colorant of the toner can be any known dye or pigment with black, yellow, cyan, and magenta specifically recited (col. 9, l. 54-56; Examples). The colorant is contained in an amount of from 0.1 to 20 wt. parts per 100 wt. parts of the binder resin (col. 14, l. 46-53).

Sakashita does not disclose a white colorant or that the colorant is present in an amount of 20 wt. %.

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Watanabe discloses a toner having a binder resin and a colorant. The colorant is black, yellow, or white, among others. The white colorant is titanium oxide (col. 4, top). This reference shows that white is a known pigment colorant for toners and is known as an alternative in the art.

Fujii discloses a white toner containing a fixing (binder) resin and a titanium dioxide pigment dispersed in the binder as a colorant (Abstract). The titanium oxide is mixed with the binder in an amount of from 1 to 50 parts, preferably 2 to 30 parts, per 100 parts of the fixing resin (col. 3, l. 50-53). Example 1 produces a specific toner from 20 parts of titanium dioxide, 100 parts of a styrene-acrylic resin, 2 parts of polypropylene, and 1.5 parts of a charge control agent. Fujii discloses useful triboelectric charge values in Table 4, such as values of $-20.1 \mu\text{C/g}$.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to produce the toner of Sakashita with a white pigment because Sakashita indicates that known colorants can be used and Watanabe discloses white pigments as known colorants for toner particles. The type and colors of the colorants overlap in Sakashita and Watanabe indicating that they are known alternatives depending on the color desired for the toner. Further Fujii strengthens the proposed combination of references by disclosing a specific white toner mixed with a ferrite carrier (Example I) and treated with hydrophobic silica. This reference shows specific features pertinent to the formulation of white toners, such as useful charging amounts and addition amounts of white pigments. Use of such charge amounts would have been obvious in order to form a white toner effective with carrier particles. Given the totality of the evidence, the artisan would have found production of a white toner obvious in Sakashita since such toners and their characteristics are well known in the art where a white image is being formed.

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Claims 3 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakashita *et al.* in US Patent 4,985,327 in view of Watanabe *et al.* in US Patent 4,956,258 and further in view of Fujii *et al.* in US Patent 4,855,204 as applied to claims 1, 2, 6, 7, 9-11, and 13 above, and further in view of Iida *et al.* in US Patent 5,922,500.

Sakashita, Watanabe, and Fujii were discussed above. Sakashita does not disclose the specifics of the hydrophobic titanium oxide, but Iida discloses hydrophobic titanium dioxide additives for toners that have improved fluidity characteristics. The titanium oxide has a specific surface area of from 100 to 350 m²/g (col. 6, l. 52-54). Binders for the toner include styrene/acrylates (col. 11, l. 10-11). Production Example 1 shows that TiO(OH)₂ is reacted with a hydrophobicizing silane in order to produce hydrophobic titanium oxide particles with a BET specific surface area of 180 m²/g. Also note Production Example 3 that forms hydrophobic titanium oxide by a similar process and has a specific surface area of 130 m²/g.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the exemplified titanium oxides disclosed by Iida in the invention of Sakashita because Iida discloses a method of making the hydrophobic titanium oxides as external toner additives which are called for by Sakashita. Iida discloses that the titanium oxides of that invention solve prior art problems of fluidity, charging, abrasive character, and environmental stability. Stable charging and environmental characteristics are disclosed as a concern in Sakashita so the artisan would have ample motivation to look to Iida to aid in solving these concerns.

Claims 5 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakashita *et al.* in US Patent 4,985,327 in view of Watanabe *et al.* in US Patent 4,956,258 and further in view of Fujii *et al.* in US Patent 4,855,204 as applied to claims 1, 2, 6, 7, 9-11, and 13

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above, and further in view of *Handbook of Imaging Materials* to Diamond, pp. 179-181 & 222-224.

Sakashita, Watanabe, and Fujii were discussed above. Sakashita does not disclose the resistivity of the ferrite carrier, but Diamond states that ferrites having resistivities of from 10^7 - 10^{11} are within the range of current interest (see Figure 5.11). Further Diamond discloses that typical toner charging is within the range of 10 to 30 $\mu\text{C/g}$ for 10 μm toners (p. 180).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to produce the ferrite of Sakashita with a resistivity between 10^7 - 10^{11} because Diamond teaches that this range is of current scientific interest and the artisan would have been expected to optimize the resistivity in Sakashita to values within the disclosed range (such as at the midpoint of 10^9) in order to produce an effective carrier at a known effective resistivity. Further, the artisan would have found it obvious to optimize the toner charge, such as near the specifically recited 30 $\mu\text{C/g}$ in Diamond because Diamond states that this is a typical charging amount for toner particles having size of about 10 μm .

Claims 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakashita *et al.* in US Patent 4,985,327 in view of Watanabe *et al.* in US Patent 4,956,258 and further in view of Fujii *et al.* in US Patent 4,855,204 as applied to claims 1, 2, 6, 7, 9-11, and 13 above, and further in view of Vail in US Patent 5,994,015.

As discussed above, the combination of Sakashita, Watanabe, and Fujii suggests a white toner having a binder resin and white colorant in the specified amounts as well as the particle size characteristics required of the claims. The combined references also suggest and exemplify preparation of a developer by combining the toner with a fluoro-resin coated carrier.

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The references do not disclose a fluororesin containing an electrically conductive particle dispersed therein for the carrier resin coating.

Vail discloses a carrier for a two-component developer that has a core **11** coated with a first conductive layer **12**. This conductive layer is comprised of fluoropolymer (col. 4, l. 10-39) and conductive particles **14**, such as carbon black (col. 4, l. 1). A second outer coating layer is deposited over the first conductive layer.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the carrier of Vail with the toner of the combination of Sakashita, Watanabe, and Fujii for formation of a two-component developer because Sakashita exemplifies the formation of a developer that contains a fluororesin coated ferrite carrier and Vail discloses a carrier that provides improved image resolution, particularly solid area images, while providing the requisite charge to the toner (Vail: col. 2, l. 54-67).

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Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher D RoDee whose telephone number is 703 308-2465. The examiner can normally be reached on most weekdays from 6 to 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Huff can be reached on 703 308-2464. The fax phone numbers for the organization where this application or proceeding is assigned are 703 872-9310 for regular communications and 703 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703 308-0661.

cdr
July 11, 2003


CHRISTOPHER RODEE
PRIMARY EXAMINER